Release notes for ENDF/B Development g-094_Pu_239 evaluation

December 2, 2016

- `checkr` Warnings:

  1. A previous error halted parsing of the current section
     MAT=9437, MF= 1, MT=451 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 1, MT=451
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      247 TO     261
     ```

  2. Although the ENDF manual says MT=18/MF=4 is allowed only for the neutron sublibrary, this is too restrictive as all fission events lead to emitted neutrons
     MAT=9437, MF= 4, MT= 18 (0): Ang. dist. OK

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 4, MT= 18
        FILE  4 ALLOWED ONLY IN A NEUTRON DATA SUBLIBRARYRECORD NUMBER     369
     ```

  3. A previous error halted parsing of the current section
     MAT=9437, MF= 4, MT= 18 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 4, MT= 18
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      369 TO     371
     ```

  4. Although the ENDF manual says MT=18/MF=5 (PFNS) and MT=455 (nubar) are allowed only for the neutron sublibrary, this is too restrictive as all fission events lead to emitted neutrons.
     MAT=9437, MF= 5, MT= 18 (0): PFNS, nubar OK

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 5, MT= 18
        FILE  5 NOT ALLOWED FOR NSUB =     0             RECORD NUMBER     373
     ```

  5. A previous error halted parsing of the current section
     MAT=9437, MF= 5, MT= 18 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 5, MT= 18
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      373 TO     380
     ```

  6. Although the ENDF manual says MT=18/MF=5 (PFNS) and MT=455 (nubar) are allowed only for the neutron sublibrary, this is too restrictive as all fission events lead to emitted neutrons.
     MAT=9437, MF= 5, MT=455 (0): PFNS, nubar OK

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 5, MT=455
        FILE  5 NOT ALLOWED FOR NSUB =     0             RECORD NUMBER     381
     ```

  7. A previous error halted parsing of the current section
     MAT=9437, MF= 5, MT=455 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=9437, MF= 5, MT=455
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      381 TO     960
     ```

- `checkr` Errors:

  1. A variable is outside the allowed ENDF range
     MAT=9437, MF= 1, MT=451 (0): Variable range

```
 ERROR(S) FOUND IN MAT=9437, MF= 1, MT=451
    MOD =     1 OUT OF RANGE     0 -     0           RECORD NUMBER     247
```

2. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 1, MT=455 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 1, MT=455
    SECTION  1/455 NOT IN DIRECTORY                RECORD NUMBER     268
```

3. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 1, MT=456 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 1, MT=456
    SECTION  1/456 NOT IN DIRECTORY                RECORD NUMBER     276
```

4. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 3, MT= 3 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 3, MT=  3
    SECTION  3/  3 NOT IN DIRECTORY                RECORD NUMBER     282
```

5. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 3, MT= 5 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 3, MT=  5
    SECTION  3/  5 NOT IN DIRECTORY                RECORD NUMBER     306
```

6. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 3, MT= 16 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 3, MT= 16
    SECTION  3/ 16 NOT IN DIRECTORY                RECORD NUMBER     328
```

7. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 3, MT= 17 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 3, MT= 17
    SECTION  3/ 17 NOT IN DIRECTORY                RECORD NUMBER     340
```

8. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 3, MT= 18 (0): Directory (b)

```
 ERROR(S) FOUND IN MAT=9437, MF= 3, MT= 18
    SECTION  3/ 18 NOT IN DIRECTORY                RECORD NUMBER     346
```

9. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 6, MT= 5 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=9437, MF= 6, MT=  5
   SECTION  6/  5 NOT IN DIRECTORY                 RECORD NUMBER     962
```

10. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 6, MT= 16 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=9437, MF= 6, MT= 16
   SECTION  6/ 16 NOT IN DIRECTORY                 RECORD NUMBER    6438
```

11. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=9437, MF= 6, MT= 17 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=9437, MF= 6, MT= 17
   SECTION  6/ 17 NOT IN DIRECTORY                 RECORD NUMBER    7745
```

- `fizcon` Errors:

1. The cross section and an outgoing distribution don't span the same energy region.
MAT=9437, MF= 5, MT= 18 (1): Diff limits (a)

```
ERROR(S) FOUND IN MAT=9437, MF= 5, MT= 18
   SECTION DOES NOT SPAN THE SAME ENERGY RANGE AS FILE   3, MT=  18
```

2. Missing files (probably spectra for outgoing particles)
MAT -1 MF 6 (1): Missing files (a)

```
ERROR(S) - MISSING SECTIONS IN MAT   -1 MF  6
   PRESENCE OF FILE 3, MT=  18 REQUIRES AN EQUIVALENT SECTION IN FILE 6
```

- `fudge-4.0` Errors:

1. Calculated and tabulated Q values disagree.
reaction label 0: n[multiplicity:'2'] + Pu237 + gamma (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -12590175.88317871 eV vs -1.26471e7 eV!
```

2. Calculated and tabulated Q values disagree.
reaction label 1: n[multiplicity:'3'] + Pu236 + gamma (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -18227568.06967163 eV vs -1.85242e7 eV!
```

3. Calculated and tabulated thresholds don't agree
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 3.5e6 eV!
```

4. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

5. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

6. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n / uncorrelated - energy - simpleMaxwellianFission: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

7. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__a / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

8. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__a / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

9. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__a / uncorrelated - energy - generalEvaporation: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

10. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__b / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

11. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__b / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

12. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__b / uncorrelated - energy - generalEvaporation: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

13. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__c / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

14. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__c / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

15. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__c / uncorrelated - energy - generalEvaporation: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

16. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__d / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

17. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__d / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

18. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__d / uncorrelated - energy - generalEvaporation: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

19. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__e / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

20. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__e / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

21. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__e / uncorrelated - energy - generalEvaporation: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

22. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__f / Multiplicity: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

23. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__f / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

24. Energy range of data set does not match cross section range
reaction label 2: n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] [total fission] / Product: n__f / uncorrelated - energy - generalEvaporation: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1e-05 -> 20000000.0) vs (3500000.0 -> 20000000.0)
```

25. Calculated and tabulated Q values disagree.
reaction label 3: sumOfRemainingOutputChannels (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -6013218.332244873 eV vs -5646579. eV!
```